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A.D. 1818 . . . . . N<sup>o</sup> 4310.

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S P E C I F I C A T I O N

OF

JAMES FRASER

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APPARATUS FOR HEATING BOILERS, &c.

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L O N D O N :

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## Apparatus for Heating Boilers, &c.

### FRASER'S SPECIFICATION.

TO ALL TO WHOM THESE PRESENTS SHALL COME, I, JAMES FRASER, of Long Acre, in the Parish of Saint Martin's in the Fields, in the County of Middlesex, Engineer and Coppersmith, send greeting.

5 WHEREAS His Royal Highness the Prince Regent, for and on behalf of His most Excellent Majesty King George the Third, by Letters Patent under the Great Seal of Great Britain, bearing date at Westminster, the Twelfth day of November, in the fifty-ninth year of His reign, did, for Himself, His heirs and successors, give and grant unto me, the said James Fraser, His special licence, that I, the said James Fraser, my exors, admors, and assigns,  
10 or such other as I, the said James Fraser, my exors, admors, or assigns, should at any time agree with, and no others, from time to time and at all times during the term of years therein expressed, should and lawfully might make, use, exercise, & vend, within England, Wales, and the Town of Berwick upon Tweed, my new and original Invention of "A JUNCTION OF  
15 TUNNELS IN A BOILER, FOR THE PURPOSE FOR LESSENING THE APPEARANCE OF SMOKE, AND FOR LESSENING THE CONSUMPTION OF FUEL, AND FOR SUCH ORIGINAL FLUES AS MAY BE PLACED IN SUCH BOILER OR THE FURNACES ATTACHED THERETO;" in which Letters Patent there is contained a proviso obliging me, the said James Fraser, by an instrument in writing, under my hand and seal, particularly to describe and  
20 ascertain the nature of my said Invention, and in what manner the same is to perform, and how to be made, and to cause the same to be inrolled in His Majesty's High Court of Chancery within two calendar months next and



*Fraser's Improvements in Apparatus for Heating Boilers, &c.*

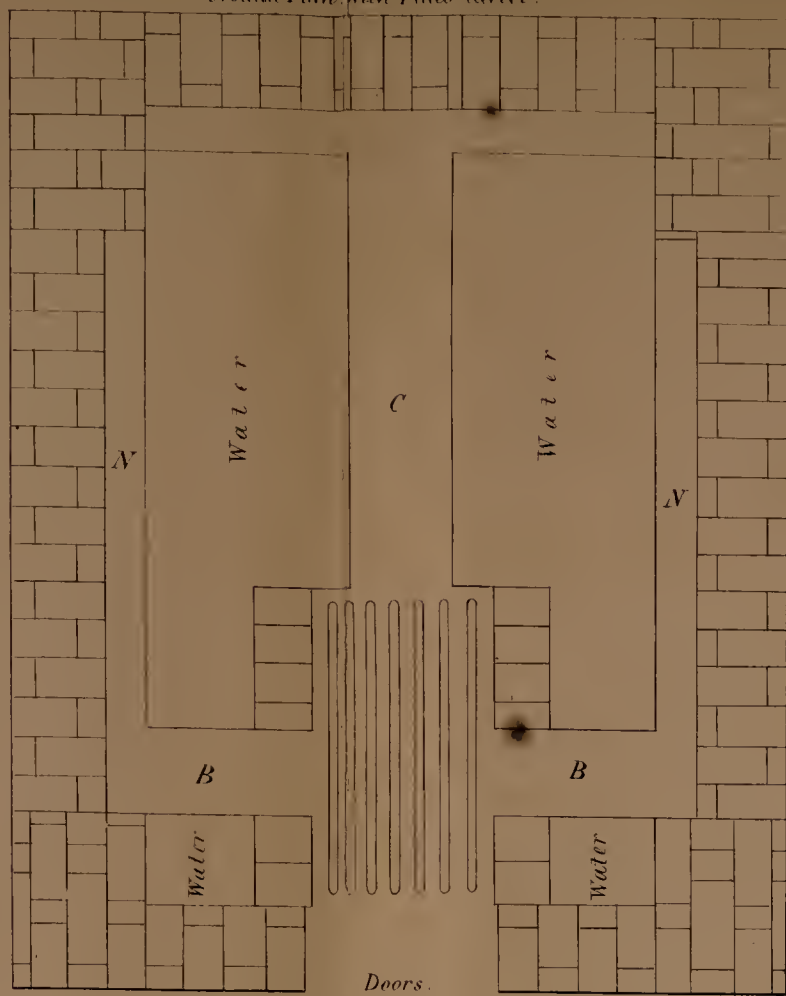
immediately after the date of the said recited Letters Patent, as in and by the same, reference being thereunto had, will more fully and at large appear.

**NOW KNOW YE**, that in compliance with the said proviso, I, the said James Fraser, do hereby declare that the nature of my said Invention, and the manner in which the same is to be made to perform, is described and 5 ascertained in the Drawing hereunto annexed, and that my new invented boiler consists of such parts as are described in such Drawing (*viz<sup>t</sup>*):—

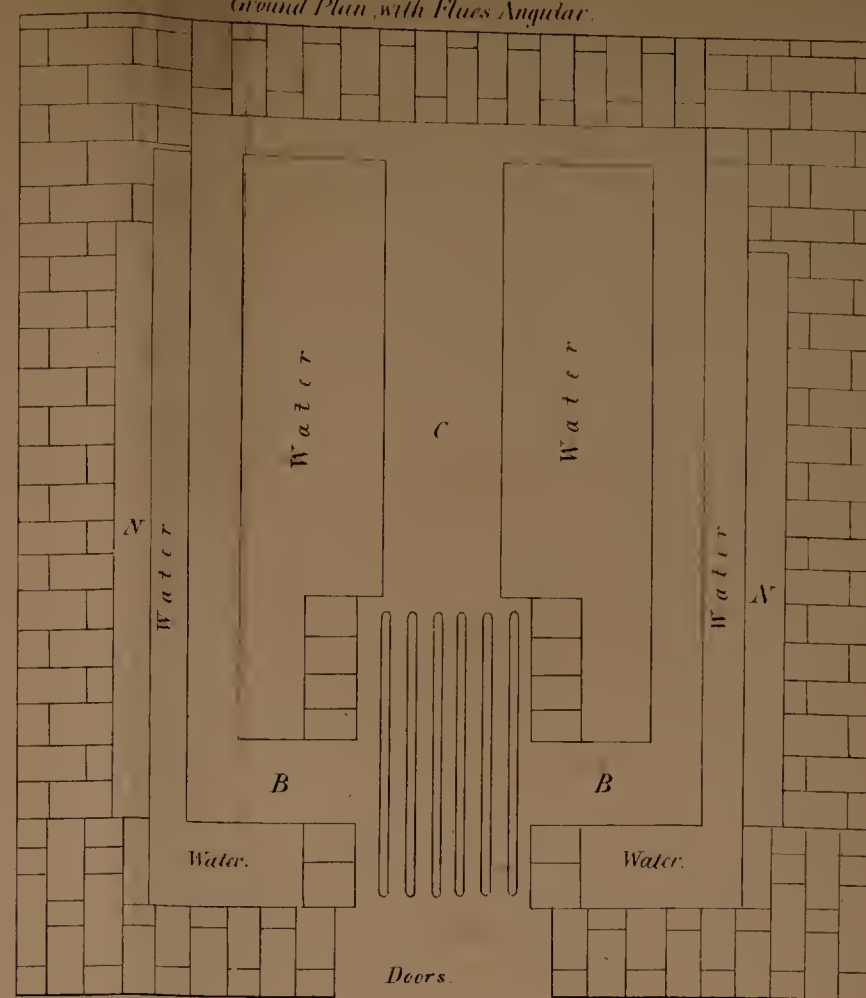
A vertical with a horizontal tunnel in a boiler, or, in other words, both these tunnels are in the midst of the water. The horizontal tunnel is the supposed fire-place, and the vertical tunnel supplies the horizontal with fuel from above, 10 so that the fire is immediately under the vertical tunnel, on the top of which is a door and register; also when the smoke is required to be burned, this register will admit of sufficient air to effect combustion and beat the smoke down into the ignited coals, and thereby lessen its quantity. The vertical hopper will also supply the boiler with a quantity of coals, so that for ordinary 15 purposes, such as for heatings by steam, may be left several hours supplying itself regularly with coals without attendance; from the junction of tunnels above mentioned, the fire and hot air descend to the secondary flue under the boiler, pass nearly its whole length, from back to front, then turns right hand and left, under the bottom, to the sides, and then to the chimney. There are 20 two flues issuing from the fire or horizontal tunnel, which meet the main flue, and present a more enlarged surface of flame and hot air to the water; and these flues may be made to pass out at the ends of the boiler, parallel with the horizontal tunnel, and then be made a common vortex. Bricks also may be placed at the flues and end of the fire; this will prevent the boiler from being 25 burned, and will assist in bringing down the regular supply of coals from the vertical tunnel. The above horizontal tunnel is supposed the primary and essential flue. What I call the secondary flue, is, in fact, the primary one of many boilers now in use, and my primary or horizontal tunnel is their secondary one. But the junction of a horizontal with a vertical tunnel opens 30 a communication in the inside of a boiler, that, independant of its convenience, presents many advantages supposed unattainable in ebullition of ten hours continuance, a more rapid combustion, and an enlarged surface, but, that all may be as simple as possible, the subjoined Drawings will ensure a complete knowledge of its structure. And I do hereby declare, that though I conceive 35 myself to have been the sole and only Inventor of the vertical tunnel boiler, that such vertical tunnel is not what I call the principal of this my present Invention, nor the horizontal tunnel either, but the Invention of both, and the new collateral flues that issue from the sides, for the purpose of



Ground Plan with Flues direct.

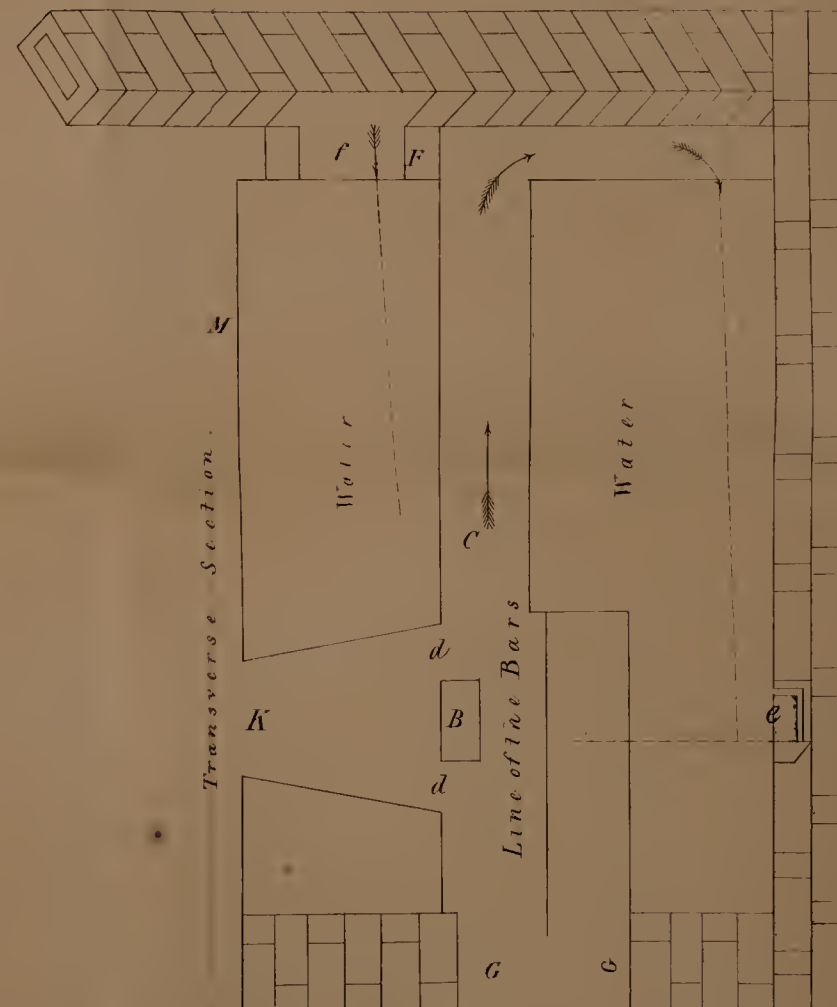
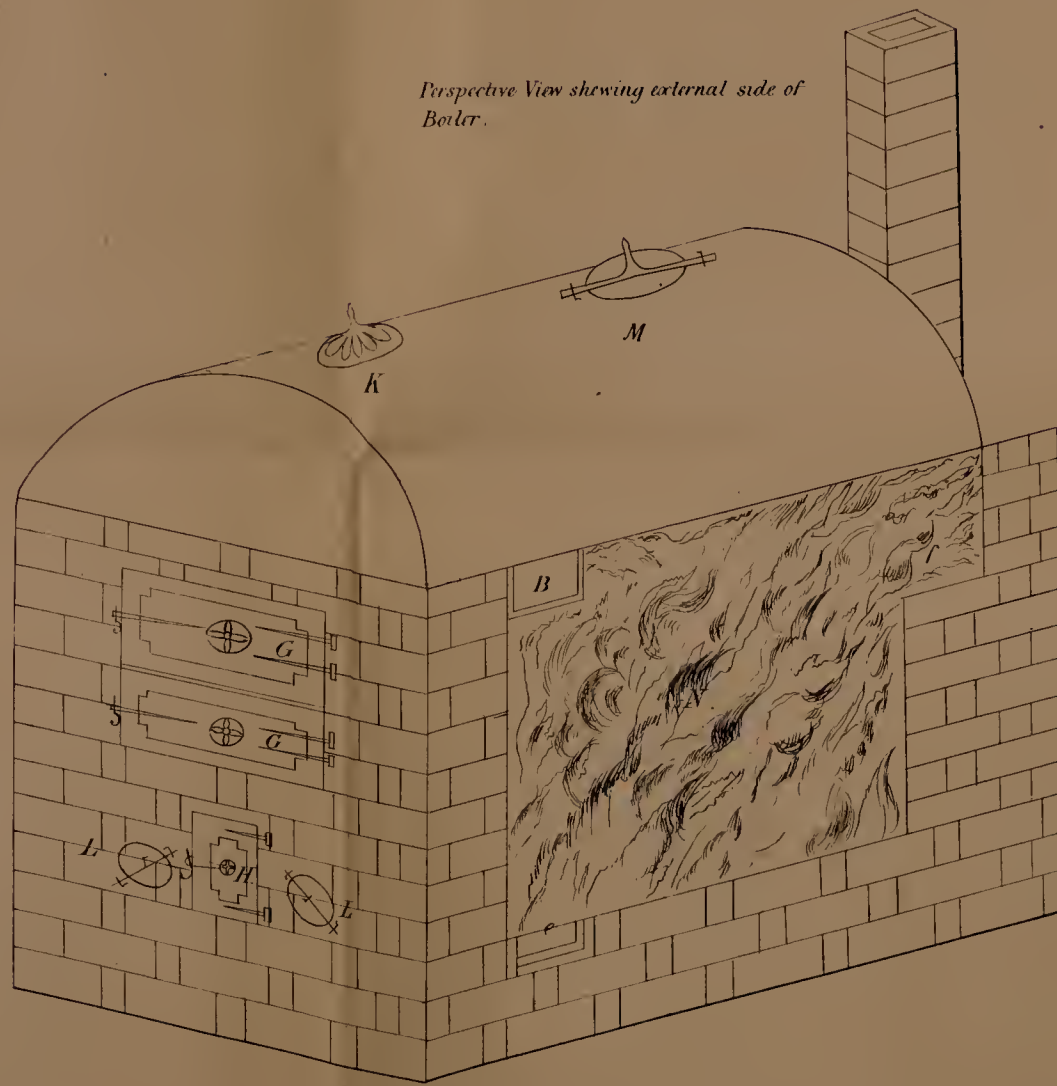


Ground Plan with Flues Angular.

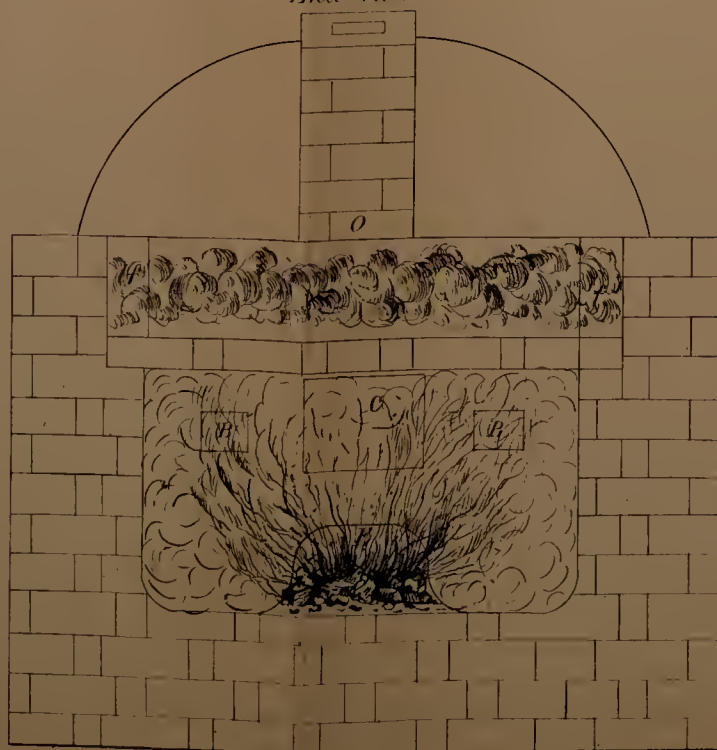


1 SHEET

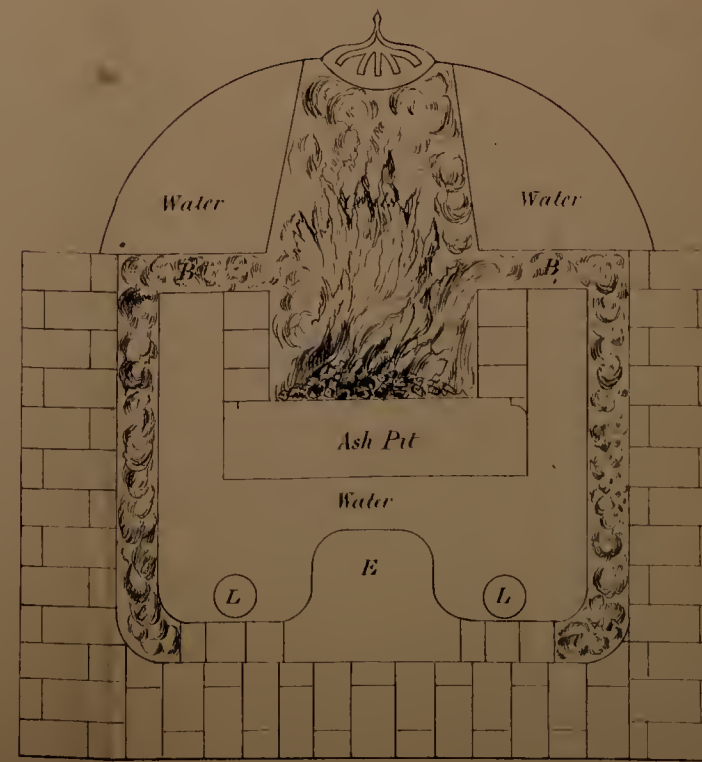
Perspective View shewing external side of Boiler.

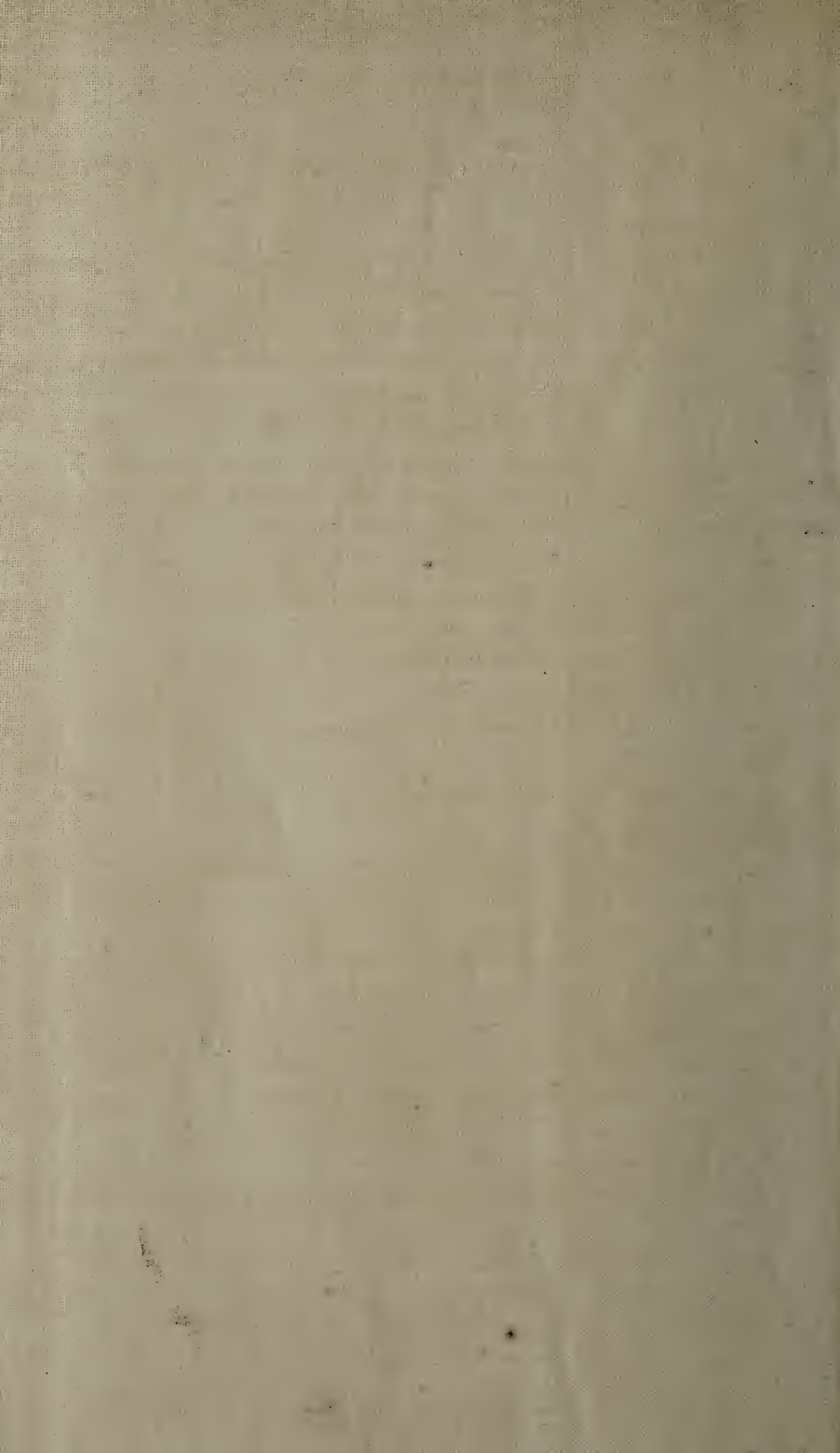


End View



Front View.







*Fraser's Improvements in Apparatus for Heating Boilers, &c.*

enlivening the fire and bringing down the fuel contained in the vertical tunnel.

In building these boilers, it is obvious that when intended for ships or other purposes where it would be improper to have external heat, the same principle  
5 may be extensively adopted without the incumbrance of brickwork, so that the manufacturer may easily join the tunnels and side flues, without the bottom, secondary, or external flue, between the brickwork and boiler.

And I do declare that I do not make claim to the tunnels separately, but my Invention consists in the junction, and also for the collateral flues that  
10 issue separately from the sides of the fire through the boiler to the main flue wherever placed, and that whether these flues and the horizontal flue or tunnel descend into the secondary flue, or rise into the shaft direct. And for the further elucidation of my Invention, and to shew the situation of the tunnels, the Drawing referred to shews as follows, viz<sup>t</sup> :—

15 A shews the junction of the horizontal to the vertical tunnel.

B, the flues, whether direct from the inside of the fire to the outside of the boiler, or the said flues passing by an angular turn out at the end of the boiler.

C, the horizontal tunnel connected with the fire-place and the vertical  
20 tunnel at the angles *d*, *d*.

E, the secondary flue or under flue, through which the fire descends from the primary flue, called the horizontal tunnel; this secondary flue also receives the heat of the flues B, when they pass out at the ends.

F, the side view of the horizontal partition that compels the contents of the  
25 horizontal tunnel and new flues to descend to the under or secondary flues, the flame of which is seen to issue out at *e*; it then traverses the sides of the boiler and passes out into the chimney or shaft at *f*; when the flues B pass out direct to the outside of the boiler, they connect with the heat of the flame E, and pass to the shaft also at *f*.

30 G, G, the doors of the fire-place.

H, a door for the purpose of cleansing or inspecting the lower or secondary flue.

K, the ventilator and door that covers the vertical flue, supplies fuel, or regulates heat by the admission of air down to the fire.

35 L, L, two pipes and plugs to clean the inside of the boiler.

M, the man-hole.

N, the sides of the boiler laid bare, to shew the action of the flame from the flue *e* and the flue B, both going into the shaft *f*.

O, end view, shews the flues *f*, going to the shaft or chimney.



*Fraser's Improvements in Apparatus for Heating Boilers, &c.*

The front view shews the doors off the fire on the bars; vertical tunnel filled with coals; and the flues B, at the top, joined to the flues e, which is seen to issue from behind the bricks.

In witness whereof, I, the said James Fraser, have hereunto set my hand and seal, the Twelfth day of January, One thousand eight hundred and nineteen. 5

JAMES (L.S.) FRASER.

Sealed and acknowledged in the  
in the presence of

THO. BENNETT,  
Tokenhouse Yard. 10

**AND BE IT REMEMBERED**, that on the Twelfth day of January, in the year of our Lord 1819, the aforesaid James Fraser, came before our said Lord the King in His Chancery, and acknowledged the Specification aforesaid, and all and every thing therein contained and specified, in form above written. And also the Specification aforesaid was stamped according to the tenor of the Statute made for that purpose. 15

Inrolled the Twelfth day of January in the year of our Lord, One thousand eight hundred and nineteen.

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